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09/866,180	05/25/2001	Isao Matsumoto	13041.14US01	4591

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EXAMINER

RUTHKOSKY, MARK

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/866,180

Applicant(s)

MATSUMOTO, ISAO

Examiner

Mark Ruthkosky

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/8/2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) ^{1-20 MR}~~1-11~~ is/are pending in the application.
- 4a) Of the above claim(s) 12-20 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-7 is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The rejection of claims 1-11 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention has been overcome by the applicant's amendment.

The rejection of claims 1-3 and 8-11 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement has been overcome by the applicant's amendment.

New Matter

The objection of claims 1-11 under 35 U.S.C. 132 because the previous amendment introduced new matter into the disclosure has been overcome by the applicant's amendment.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The rejection of claims 1, 2, and 8 under 35 U.S.C. 103(a) as being unpatentable over Kito et al. (US 6,258,487 B1) in view of Nagaura et al. (US 5,534,369) has been overcome by the applicant's amendment.

The rejection of claims 1-3 and 8 under 35 U.S.C. 103(a) as being unpatentable over Kaido et al. (US 6,284,405) in view of Nagura et al. (US 5,534,369) has been overcome by the applicant's amendment.

The instant claims are to spiral-rolled electrodes for batteries having a concentric circle shape or elliptical shape including a positive electrode, a negative electrode and a separator there between. The positive and/or negative electrode comprises combinations of plural electrode plates selected from groups of plates classified by weight to provide a desired battery capacity. Each combination of plates in the positive and/or negative electrode has a substantially constant total amount of active or pseudo active material and the positive and/or said negative electrodes are within the range of ± 1 wt.% of the average for a plurality of positive and/or negative electrodes. Each electrode plate in the electrode is wound in series with an interval between each plate. Each of the electrode plates has at least two chamfered corners.

Claims 1, 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kito et al. (US 6,258,487 B1), in view of Webb et al. (US 6,300,002.)

Kito et al. (US 6,258,487 B1) teaches a battery including spiral-rolled electrodes with a divided electrode base plate. The battery has a concentric circle shape or elliptical shape and includes a positive electrode, a negative electrode and a separator there between. The combination of plates has a substantially constant amount of active or pseudo active material as one electrode is prepared and divided into equivalent sections (col. 7, lines 1-15.) The electrodes inherently are selected and have an individual weight. With regard to the process of selecting the plates, the limitation has been considered, but is not given patentable weight, as it does not

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define the claimed product. The electrodes are wound into a battery. Each segment it taught to have a lead (col. 5, lines 20-35.) Kito et al. (US 6,258,487 B1) does not teach electrode plates having at least two chamfered corners, however does teach that the divided electrodes could have various shapes (col. 5, lines 12-26.)

Webb et al. (US 6,300,002) teaches a battery including spiral-rolled electrodes with a divided electrode base plate. The battery has a concentric circle shape or elliptical shape and includes a positive electrode, a negative electrode and a separator there between. The electrodes have four chamfered corners. It would be obvious to one of ordinary skill in the art at the time the invention was made to include chamfered corners on an electrode in order to alter the shape of the electrode plate or the corner of the electrode to have a chamfered shape as taught by Webb. Rounded corners are known in the art to facilitate the introduction of electrode ends into gages and rollers used to form a cylindrical battery (col. 4, lines 1-30.) The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

With regard to the limitation that the positive and/or said negative electrodes are within the range of ± 1 wt.% of the average for a plurality of positive and/or negative electrodes, it would be obvious to one of ordinary skill in the art at the time the invention was made to combine positive and/or negative electrodes in a lithium ion battery such that they have equivalent weights of active material in order to have a reversible reaction that utilizes the full amount of active material in each electrode. In a lithium ion battery, the anode active material includes lithium ions intercalated into the active material. As the battery cycles between charge and discharge, the ions intercalate into the cathode active material upon battery discharge and reversibly into the anode again when charged (see '487, col. 1, lines 19-29.) As the reaction is a

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1:1 reaction, the amount of each material must be equivalent in order for the lithium ions to optimally react at each site. If the amount of one active material is less than the other, the lesser amount will be the limiting factor in the battery reaction and the excess active material will be wasted (for example, see '487, col. 4, lines 38-62.) The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

Claims 1-3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaido et al. (US 6,284,405) in view of Webb et al. (US 6,300,002.)

Kaido et al. (US 6,284,405) teaches a battery including spiral-rolled electrodes with a divided electrode base plate. The battery has a concentric circle shape or elliptical shape and includes a positive electrode, a negative electrode and a separator there between. The plate includes a conductive plate with an active material coated onto sections of the plate in a manner to leave an uncoated area along an edge of the plate and at predetermined intervals in a winding direction (claims 1-31 and the figures.) The uncoated edge area is used to attach a conductive tab plate in order to transfer charge. The reference does not teach electrode plates having at least two chamfered corners.

Webb et al. (US 6,300,002) teaches a battery including spiral-rolled electrodes with a divided electrode base plate. The battery has a concentric circle shape or elliptical shape and includes a positive electrode, a negative electrode and a separator there between. The electrodes have four chamfered corners. It would be obvious to one of ordinary skill in the art at the time the invention was made to include chamfered corners on an electrode in order to alter the shape of the electrode plate or the corner of the electrode to have a chamfered shape as taught by

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Webb. Rounded corners are known in the art to facilitate the introduction of electrode ends into gages and rollers used to form a cylindrical battery (col. 4.) The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

With regard to the limitation that the positive and/or said negative electrodes are within the range of ± 1 wt.% of the average for a plurality of positive and/or negative electrodes, it would be obvious to one of ordinary skill in the art at the time the invention was made to combine positive and/or negative electrodes in a lithium ion battery such that they have equivalent weights of active material in order to have a reversible reaction that utilizes the full amount of active material in each electrode. In a lithium ion battery, the anode active material includes lithium ions intercalated into the active material. As the battery cycles between charge and discharge, the ions intercalate into the cathode active material upon battery discharge and reversibly into the anode again when charged (see '405, col. 16, lines 34-60.) As the reaction is a 1:1 reaction, the amount of each material must be equivalent in order for the lithium ions to optimally react at each site. As noted in Kaido, if the amount of one active material is less than the other, the lesser amount will be the limiting factor in the battery reaction and the excess active material will be wasted or damaging to the battery. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitoh et al. (US 6,258,487 B1) OR Kaido et al. (US 6,284,405), in view of Webb et al. (US 6,300,002), as applied above, and further in view of Nakai et al. (JP 60-180,058.)

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Kitoh et al. (US 6,258,487 B1) and Kaido et al. (US 6,284,405) teach a battery including spiral-rolled electrodes with a divided electrode base plate as previously described. Chamfered corners are noted in the previous rejections, as noted. The references are silent to the dimensions of the sidewalls and bottom of the battery case. Nakai et al. (JP 60-180,058, abstract), however, teaches a cylindrical battery container wherein the thickness of the sidewalls of the case is made to be more thin than the thickness of the bottom of the container. The ratio of the thickness of the bottom to the sidewalls is greater than 1.5. The thicker part is at the border of the sidewall and the case as well as along the entire bottom of the case. It would be obvious to one of ordinary skill in the art at the time the invention was made to make the thickness of the sidewalls of the case of Kitoh et al. (US 6,258,487 B1) OR Kaido et al. (US 6,284,405) to be more thin than the thickness of the bottom of the container in a ratio of greater than 1.5. The resultant can allows for a durable casing and will improve the battery characteristics by increasing the inner diameter and volume of the can thus allowing for more active material and a higher capacity. The artisan would have found the claimed invention to be obvious in light of the teachings of the references.

With regard to claim 11, the reference does not teach a battery wherein the adjacent positive terminal of the battery is welded by a metallic connector to the bottom of the adjacent battery case. Connecting batteries in series is broadly known in the art to increase the voltage of a battery. It would be obvious to one of ordinary skill in the art at the time the invention was made to weld a connector between two adjacent batteries in order to allow for a connection in series. Welding the connector will provide a secure connection to the terminals, which will allow for the transfer of electrons.

Allowable Subject Matter

Claims 4-7 are allowed.

The following is an examiner's statement of reasons for indicating allowable subject matter. The instant claims are to spiral-rolled electrodes for batteries having a concentric circle shape or elliptical shape including a thin nickel positive electrode, a thin metal hydride negative electrode and a separator wound in between. The positive and negative electrodes comprise a combination of plural electrode plates wound in series in order. Each combination of plates has a substantially constant amount of active or pseudo active material. Each electrode plate in the electrode is wound in series with an interval between each plate. The thickness of the electrode at the side where the winding starts is thinner than the thickness of the electrode at the side where the winding ends. The prior art does not teach a nickel metal hydride battery where the positive and negative electrodes comprises a combination of plural electrode plates wound in series in order; each electrode plate in the electrode is wound in series with an interval between each plate; and thickness of the electrode at the side where the winding starts is thinner than the thickness of the electrode at the side where the winding ends.

Wound batteries with separated electrode plates are well described in the art as noted by Kito et al. (US 6,258,487 B1) and Nagura et al. (US 5,534,369) as applied. The references do not teach batteries including a thin nickel positive electrode, a thin metal hydride negative electrode and a separator wound in between or that the thickness of the electrode at the side where the winding starts is thinner than the thickness of the electrode at the side where the winding ends. As such, the claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed 9/8/2005 have been fully considered but they are not persuasive. The rejections based on 35 U.S.C. 112 have been overcome by the applicant's amendment.


With regard to the rejections under 35 U.S.C. 102 and 103, the arguments have been considered. New elements in the rejections are presented based on the amended claims. The references do not teach that the positive and/or said negative electrodes are within the range of \pm 1 wt.% of the average for a plurality of positive and/or negative electrodes. Both Kito et al. (US 6,258,487 B1) and Kaido et al. (US 6,284,405) teach lithium ion batteries that cycle between charge and discharge, wherein the ions intercalate into the cathode active material upon battery discharge and reversibly into the anode again when charged (see '405, col. 16, lines 34-60.) As the reaction is a 1:1 reaction, the amount of each material must be equivalent in order for the lithium ions to optimally react at each site (see '487, col. 1, lines 19-29; and col. 4, lines 38-62.) As noted in Kaido, if the amount of one active material is less than the other, the lesser amount will be the limiting factor in the battery reaction and the excess active material will be wasted or damaging to the battery. The art would have found the claimed invention to be obvious in light of the teachings of the references.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mark Ruthkosky
Primary Patent Examiner
Art Unit 1745


11/14/05